

ABSTRACT

The present interdependent group of inventions pertains to methods of and devices for lump separation of raw material and may be used in ferrous and non-ferrous metal ore dressing, concentration of mining and chemical raw materials, processing secondary raw materials and technological wastes.

The method and the device are based on the idea that a lump comprises a useful component and refuse, and such lump is exposed to ultrahigh frequency (UHF) electromagnetic field. The frequency selected is such that electromagnetic wave penetration depth will exceed the maximum linear size of a lump under conditions of maximum damping of electromagnetic wave, which depends upon characteristics of such lump material. The energy of UHF electromagnetic radiation absorbed by a lump material causes heating of the lump components. A component with higher electric conductivity will absorb UHF energy higher than UHF energy absorbed by a component with lower electric conductivity during the same period of time. As a result, after removing the UHF field the useful component and the refuse will be heated to different temperatures. A lump temperature profile will depend on mass ratio of components with different properties within such lump, and said temperature profile is registered by a thermographic system.

The invention implementation will make possible to increase the useful component content from 6 ~ 10% to 18 ~ 25% under conditions and loads unchanged, increase weight % of the useful component to 4.5% while decreasing its content in tails to 3%, decrease the total electric energy consumption by 5% due to decrease of refuse content in the raw material being concentrated. 7 independent claims, 6 figures